

## CLAIMS

1. Method for detecting a passage associated with an access door, for example an immigration control point, a boarding gate or the entrance to a secure building in particular in order to guarantee the passage of one person only, characterized in that the profile of the person is determined by means of a vertical  
5 row of infra-red emitting cells (D1) arranged at the entry to the door opposite receiving cells connected to a control unit (CU) which manages the sampling and the frequency of emission of the signals and as a function of this profile, the access door is opened or remains closed.
- 10 2. Method according to claim 1, characterized in that certain zones of the profile are filtered in order to mask them or to eliminate interference zones.
3. Method according to claim 2, characterized in that the profile is divided  
15 into zones which are processed separately.
4. Method according to one of claims 2 or 3, characterized in that each zone is characterized as a function of its dimension in order to determine whether the zone corresponds to a person, a child or an object.
- 20 5. Method according to one of claims 2 to 4, characterized in that each zone which touches the ground is characterized in order to distinguish by the shape of the zone, a child from a trolley and a child from a satchel or a backpack.
6. Method according to one of claims 2 to 5, characterized in that each  
25 zone which does not touch the ground is characterized in order to distinguish a carried child from an item of luggage.
7. Method according to one of claims 2 to 6, characterized in that an  
30 additional filtering is carried out in order to eliminate backward movements of the person.

8. Method according to one of claims 1 to 7, characterized in that the profiles are reduced to their true size.

5        9. Method according to one of claims 3 to 8, characterized in that after dividing the profile into zones, the size and the volume of each zone is determined.

10       10. Method according to one of claims 3 to 9, characterized in that after identification of a zone touching the ground, a trolley or bag is identified as a function of the volume of the zone.

15       11. Method according to one of claims 3 to 10, characterized in that after identification of a zone not touching the ground, a child or a bag is identified as a function of the volume of the zone.

12. Method according to one of claims 2 to 11, characterized in that after filtering and before dividing into zones, the passage of several people side by side is detected.

20       13. Method according to one of claims 1 to 12, characterized in that from the profile obtained, in particular:

- a person accompanied by a child,
  - two people following one another very closely,
  - a person moving forwards then backwards and moving forwards again,
  - 25       - a person jumping,
  - a child following a large trolley,
  - a person carrying a backpack,
  - a person carrying a child on their back
- are detected.

30       14. Method according to one of claims 1 to 13, characterized in that, by means of a speed sensor (D3), the speed of passage of the person is determined and the profile created by the first detection level is modified in order to obtain a profile independent of the speed of passage.

35       15. Method according to claim 14, characterized in that the speed of passage is determined by means of a Doppler radar (D3).

16. Method according to claim 14, characterized in that the speed of passage is determined by means of a distance sensor.

5        17. Method according to claim 14, characterized in that the speed of passage is determined by means of successively passing through at least two infrared barriers.

10        18. Method according to one of claims 1 to 15, characterized in that the presence of a cold body is detected by means of a second detection level formed by at least one passive infrared cell (D2).

15        19. Method according to claim 18, characterized in that the second detection level precedes a third detection level which is constituted by the movement direction sensor (D3).

20        20. Method according to claim 19, characterized in that the third detection level precedes a fourth detection level which is constituted by the speed sensor (D3).

21. Method according to claim 20, characterized in that, by means of a fifth detection level (D4) the simultaneous passage of two people is detected.

25        22. Method according to claim 21, characterized in that the detection is carried out by means of ultrasonic sensors (D4) arranged transversely to the passage.

30        23. Method according to claim 22, characterized in that the detection is carried out by means of a laser cooperating with a rotating mirror in order to determine the profile in a plane perpendicular to the profile itself.

24. Method according to claim 22, characterized in that the detection is carried out by means of recognition of an image taken facing the passage in order to determine the profile in a plane perpendicular to the profile itself.

5        25. Method according to claim 22, characterized in that the detection is carried out by means of a capacitive measurement (DMI).

26. Method according to claim 22, characterized in that the detection is carried out by means of distance sensors in order to detect the position of the feet  
10 in order to determine:

- a) if a person's legs are far apart,
- b) if a person has a trolley beside them,
- c) if two people are passing through side by side.

15        27. Method according to claim 26, characterized in that in order to distinguish between cases b) and c) temperature sensors are used.

28. Method according to claim 21, characterized in that the detection is carried out by two crossed series of level 1 sensors.  
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29. Method according to claim 21, characterized in that the detection is carried out by a capacitive measurement system sensitive to the dielectric characteristics of the human body.

25        30. Method according to one of claims 14 to 29, characterized in that by means of the speed sensor (D3) a person turning back on themselves is detected.

31. Device for detecting a passage associated with an access door, for example a boarding gate or for entry to a secure building in particular in order to  
30 guarantee the passage of one person only, characterized in that it comprises:

- a first detection level formed by a vertical row of active infrared emitting cells (D1) arranged opposite a vertical row of receiving cells in order to determine the profile of a person who is entering, these cells being

connected to a central processing unit (CPU) which manages the sampling and the frequency of emission of the signals and means for controlling the opening of the access door or keeping it in the closed state.

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32. Device according to claim 31, characterized in that it comprises a second detection level formed by a passive infrared cell (D2), for detecting the presence of a cold body.

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33. Device according to one of claims 30 or 31, characterized in that it comprises:

- a speed sensor (D3), for determining the speed of passage of the person,
- means for modifying the profile determined by the first detection level in order to obtain a profile independent of the speed of passage,
- means for comparing the profile obtained with an architecture of profiles contained in a memory.

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34. Device according to claim 33, characterized in that the means for determining the speed of passage include a Doppler radar (D3).

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35. Device according to claim 33, characterized in that the second detection level precedes the third detection level which is constituted by the speed sensor (D3).

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36. Device according to one of claims 31 to 35, characterized in that it comprises a detection level for detecting the simultaneous passage of two people, comprising ultrasonic sensors (D4) arranged transversely to the passage.

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37. Device according to one of claims 31 to 35, characterized in that it comprises a central processing unit (CPU) communicating with the different detection levels and with a memory (M) comprising an architecture of profiles, this control unit (CU) being able to compare the profiles determined by the sensors

(D1, D2, D3, D4) to the profiles contained in the memory, to control as a function of the results of this comparison the opening of the access door or keeping it in the closed state and optionally triggering an alarm.

5           38. Device according to one of claims 35 to 37, characterized in that the radar (D3) of the third detection level is arranged at a certain distance from the entry (1) to the access door and is orientated so as to send its beam towards this entry (1).

10           39. Device according to one of claims 32 to 38, characterized in that the passive infrared cells (D2) of the second detection level comprise at least two cells arranged one above the other at the entry (1) to the door and orientated so as to send their beam transversely to the passage.

15           40. Device according to one of claims 36 to 39, characterized in that the sensors for the detection level of the simultaneous passage of several people comprise at least three ultrasonic sensors (D4) arranged at the upper part of the entry (1) to the access door and orientated so as to diffuse their beam downwards.

20           41. Device according to one of claims 31 to 40, in which the access door is bidirectional, characterized in that the entry (1) to and the exit (2) from the door each comprise a group of sensors (D1, D2, D3, D4) having identical functions.